CLAIMS

1. A multiphase, composite material comprising:

a first, active, phase comprising an amorphous, electrochemically active material; and

a second, stabilizer, phase comprising a material selected from the group consisting of: metals, carbon, ceramics, intermetallic compounds, and combinations thereof, said stabilizer phase being configured as a plurality of spaced-apart regions having said active phase disposed therebetween.

2. The material of claim 1, wherein said active phase comprises, on a weight basis, 30-60% of said material.

3. The material of claim 1, wherein said active phase comprises a material selected from the group consisting of: Sn, Sb, Bi, Pb, Ag, In, Si, Ge, Al, and combinations thereof.

4. The material of claim 1, wherein said active phase includes a member selected from the group consisting of: Sn, Si, Al, and combinations thereof.

5. The material of claim 3, wherein said active phase includes nanophase domains of said electrochemically active material therein.

6. The material of claim 5, wherein said nanophase domains have a size in the range of 10-30 nanometers.

7. The material of claim 5, wherein said nanophase domains comprise tin.

8. The material of claim 1, wherein said stabilizer phase includes at least one element selected from the group consisting of: Fe, Zr, Ti, and C.

9. The material of claim 1, wherein said stabilizer phase comprises a member selected from the group consisting of: metal nitrides, metal carbides, metal oxynitrides, metal oxycarbides, and combinations thereof.

10. The material of claim 1, wherein the spaced apart regions of said stabilizer phase have a size in the range of 1-100 nanometers.

11. The material of claim 1, wherein said stabilizer phase comprises an amorphous material.

12. The material of claim 1, wherein said stabilizer phase comprises a crystalline material.

13. The material of claim 1, wherein said stabilizer phase is electrochemically inactive.

14. The material of claim 1, wherein said stabilizer phase is electrochemically active.

15. The material of claim 1, wherein said stabilizer phase comprises an iron-tin material.

16. The material of claim 1, wherein said stabilizer phase comprises $FeSn_2$.

17. The material of claim 1, wherein said material is prepared by a mechanical alloying process.

18. The material of claim 17, wherein said mechanical alloying process is a ball milling process.

19. The material of claim 17, wherein said mechanical alloying process is an attritor milling process.

20. The material of claim 17, wherein said mechanical alloying process is a grinding process.

21. An electrode comprising:

a multiphase composite material, said multiphase composite material comprising: a first, active, phase comprising an amorphous, electrochemically active material; and a second, stabilizer, phase comprising a material selected from the group consisting of: metals, carbon, ceramics, intermetallic compounds, and combinations thereof, said stabilizer phase being configured as a plurality of spaced apart regions having said active phase disposed therebetween.

22. The electrode of claim 21, wherein said active phase comprises a material selected from the group consisting of: Sn, Sb, Bi, Pb, Ag, In, Si, Ge, Al, and combinations thereof.

23. The electrode of claim 21, wherein said stabilizer phase includes at least one element selected from the group consisting of: Fe, Zr, Ti, and C.

24. The electrode of claim 21, wherein said stabilizer phase comprises a member selected from the group consisting of: metal nitrides, metal carbides, metal oxynitrides, metal oxycarbides, and combinations thereof.

25. A battery including at least one electrode comprised of a multiphase, composite material, said material comprising:

a first, active, phase comprising an amorphous, electrochemically active material; and

a second, stabilizer, phase comprising a material selected from the group consisting of metals, carbon, ceramics, intermetallic compounds, and combinations thereof, said stabilizer phase being configured as a plurality of spaced apart regions having said active phase disposed therebetween.

26. A method of making a multiphase composite material, said method comprising the steps of:

providing a plurality of components, said components including the elements of which said multiphase composite material is comprised; and

subjecting said plurality of components to a mechanical alloying process; whereby said multiphase composite material is formed.

27. The method of claim 26, wherein said mechanical alloying process comprises a staged process wherein a first portion of said plurality of components are subjected to a first mechanical alloying process so as to produce a first component of said multiphase composite material, and a second portion of said components are subsequently subjected to a second mechanical alloying process with said first component.

28. The method of claim 26, wherein said mechanical alloying process is a substitutional process wherein, in a first step, a first composition which includes a first and second element of said multiphase composite material is subjected to a mechanical alloying process along with a third element of said multiphase composite material wherein said third element displaces said second element from said first composition so as to form a second composition which includes said first and third element.

29. The method of claim 28, wherein said third element is subjected to said mechanical alloying process with said first compound in the form of a free element.

30. The method of claim 28, wherein said third element is subjected to said mechanical alloying process with said first composition in the form of a third composition, which third composition is comprised of said third element and a fourth element of said multiphase composite material.